WHAT CLAIMED IS:

1. A boding pad structure, comprising:

a copper layer;

a passivation layer over the copper layer having a pad window to expose a portion of the copper layer;

a barrier layer conformal to a profile of the pad window; and

an aluminum pad located in the pad window.

2. The bonding pad structure of claim 1, wherein the barrier layer is selected from the group consisting of aluminum (Al), tantalum (Ta), tantalum nitride (TaN), titanium nitride (TiN), and tungsten nitride (WN), mixtures thereof, combinations thereof and alloys thereof.

3. The bonding pad structure of claim 1, wherein the aluminum pad is an aluminum, aluminum alloy or aluminum dominated layer.

4. A bonding pad structure, comprising:

a copper layer;

a passivation layer over the copper layer having a pad window to expose a portion of the copper layer;

a barrier layer conformal to a profile of the pad window and extended along the surface of the passivation layer from the pad window; and

an aluminum pad located over the barrier layer.

5. The bonding pad structure of claim 4, wherein the barrier layer is selected from the group consisting of aluminum (Al), tantalum (Ta), tantalum nitride (TaN), titanium nitride (TiN), and tungsten nitride (WN), mixtures thereof, combinations thereof and alloys thereof.

6. The bonding pad structure of claim 4, wherein the aluminum pad is an aluminum, aluminum alloy or aluminum dominated layer.

7. A method for manufacturing a bonding pad structure, comprising steps of:

providing a substrate with a copper layer over the substrate;

forming a passivation layer over the copper layer;

forming a pad window within the passivation layer to expose a portion of the copper layer;

forming a barrier layer over the passivation layer and the pad window;

removing a portion of the barrier layer over the passivation layer;

forming a metal layer over the passivation layer and filled in the pad window; and

removing a portion of the metal layer to expose the passivation layer.

8. The method of claim 7, wherein the metal layer comprises an aluminum, aluminum alloy or aluminum dominated layer.

9. The method of claim 7, wherein the portion of the metal layer is removed by a chemical mechanical polishing (CMP) process.

10. The method of claim 7, wherein the portion of the metal layer is removed by an etching process.

11. The method of claim 7, wherein the barrier layer is selected from the group consisting of aluminum (Al), tantalum (Ta), tantalum nitride (TaN), titanium nitride (TiN), and tungsten nitride (WN), mixtures thereof, combinations thereof and alloys thereof.

12. The method of claim 7, wherein the passivation layer comprises an doped oxide, an undoped oxide, nitride or combinations thereof.

13. The method of claim 7, wherein the portion of the barrier layer is removed by a

chemical mechanical polishing (CMP) process.

14. A method for manufacturing a bonding pad structure, comprising steps of:

providing a substrate with a copper layer over the substrate;

forming a passivation layer over the copper layer;

forming a pad window within the passivation layer to expose a portion of the copper layer;

forming a barrier layer over the passivation layer and the pad window;

forming a metal layer over the barrier layer and filled in the pad window; and

removing a portion of the metal layer and the underlying barrier layer to expose the passivation layer.

15. The method of claim 14, wherein the metal layer comprises an aluminum, aluminum alloy or aluminum dominated layer.

16. The method of claim 14, wherein the portion of the metal layer and the underlying barrier layer are removed by a chemical mechanical polishing (CMP) process.

17. The method of claim 14, wherein the portion of the metal layer and the underlying barrier layer are removed by an etching process.

18. The method of claim 14, wherein the barrier layer is selected from the group consisting of aluminum (Al), tantalum (Ta), tantalum nitride (TaN), titanium nitride (TiN), and tungsten nitride (WN), mixtures thereof, combinations thereof and alloys thereof.

19. The method of claim 13, wherein the passivation layer comprises an doped oxide, an undoped oxide, nitride or combinations thereof.

20. A method for manufacturing a bonding pad structure, comprising steps of:

providing a substrate with a copper layer over the substrate;

forming a passivation layer over the copper layer;

forming a pad window within the passivation layer to expose a portion of the copper layer;

forming a barrier layer over the passivation layer and the pad window;

forming a metal layer over the barrier layer and filled in the pad window; and

forming a photoresist layer over the metal layer, wherein the photoresist layer has a pattern covering the pad window;

removing a portion of the metal layer and the barrier layer to expose the passivation layer; and

removing the photoresist layer.

21. The method of claim 20, wherein the metal layer comprises an aluminum, aluminum alloy or aluminum dominated layer.

22. The method of claim 20, wherein the portion of the metal layer and the underlying barrier layer are removed by an etching process.

23. The method of claim 20, wherein the barrier layer is selected from the group consisting of aluminum (Al), tantalum (Ta), tantalum nitride (TaN), titanium nitride (TiN), and tungsten nitride (WN), mixtures thereof, combinations thereof and alloys thereof.

24. The method of claim 20, wherein the passivation layer comprises an doped oxide, an undoped oxide, nitride or combinations thereof.